

KEYSPAN ENERGY DELIVERY NEW ENGLAND  
D.T.E. 01-105

FIRST SET OF INFORMATION REQUESTS OF THE  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO  
KEYSPAN ENERGY DELIVERY NEW ENGLAND

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Pursuant to 220 C.M.R. § 1.06(6)(c) the Department of Telecommunications and Energy ("Department") submits to KeySpan Energy Delivery New England ("KeySpan" or the "Company") the following Information Requests.

**Instructions**

The following instructions apply to this set of Information Requests and all subsequent Information Requests issued by the Department to the Company in this proceeding.

1. Each request should be answered in writing on a separate, three-hole punch page with a recitation of the request, a reference to the request number, the docket number of the case and the name of the person responsible for the answer.
2. Do not wait for all answers to be completed before supplying answers. Provide the answers as they are completed.
3. These requests shall be deemed continuing so as to require further supplemental responses if KeySpan or its witness receives or generates additional information within the scope of these requests between the time of the original response and the close of the record in this proceeding.
4. The term "provide complete and detailed documentation" means:  
  
Provide all data, assumptions and calculations relied upon. Provide the source of and basis for all data and assumptions employed. Include all studies, reports and planning documents from which data, estimates or assumptions were drawn and support for how the data or assumptions were used in developing the projections or estimates. Provide and explain all supporting work-papers.
5. The term "document" is used in its broadest sense and includes, without limitation, writings, drawings, graphs, charts, photographs, phono-records, microfilm, microfiche, computer printouts, correspondence, handwritten notes, records or reports, bills, checks, articles from journals or other sources and other data compilations from which information can be obtained and all copies of such documents that bear notations or other markings that differentiate such copies from the original.

6. If any one of these requests is ambiguous, notify the Hearing Officer so that the request may be clarified prior to the preparation of a written response.
7. Please serve one copy of the responses on Mary Cottrell, Secretary of the Department, and one copy to the Service List.

### **Questions**

- D.T.E. 1-1 Please refer to page 35, and also to Section III.C, Charts III-C-1, and Chart III-C-2 of the Company's filing.
- (a) Please explain why the Company used weather data obtained from the Logan International Airport (LIA) weather station to establish baseline sendout requirements for the Essex, Lowell and Cape Cod Divisions;
  - (b) Please show graphically, using line graphs, and also in a tabular form, the average monthly minimum, the average monthly maximum and the average temperatures for Boston/LIA, Essex, Lowell and Cape Cod Divisions for each of the past twenty (20) years. Please plot the graphs for the four geographic areas for each year on the same axis to facilitate easy comparison of the graphs;
  - (c) Please calculate the Effective Degree Days (EDDs) for Boston/LIA, Essex, Lowell and Cape Cod Divisions for each of the past five years. Please present your answer graphically, using line graphs, and in a tabular form. Please plot the graphs for the four geographic areas for each year on the same axes to facilitate easy comparison of the graphs;
  - (d) Using weather data for the past year only, please calculate bivariate correlation coefficients using (i) the average monthly minimum temperature, (ii) the average monthly maximum temperature, and (iii) the average monthly temperature for the four geographic areas (Boston/LIA, Essex, Lowell and Cape Cod Divisions). Please present your answer in the form of a correlation matrix.
- D.T.E. 1-2 Please refer to Section III.C, Charts III-C-1, and Chart III-C-2 of the Company's filing.
- (a) Please discuss the method(s) that the Company used to estimate the regression equations for the baseline sendout requirements for each of the four geographic areas (Boston, Essex, Lowell and Cape Cod) comprising the KeySpan service territory. Please explain the decision behind the choice of the method(s);
  - (b) Please state the underlying assumption(s) of the method(s) used in (a) above, and explain how the Company tested these assumptions to be sure that none are violated. Please provide evidence to support your answer;
  - (c) Please explain how the Company decided on the best regression model for establishing the baseline sendout requirement. Also list and discuss the

- explanatory variables that the Company considered in the model building process. Please provide evidence in support of your answer;
- (d) Please discuss the main theoretical, conceptual, and practical issues that the Company addressed in establishing the baseline sendout requirement;
  - (e) Please specify which diagnostic and other tests KeySpan performed in the regression analyses (e.g., tests to detect multicollinearity in the data, tests to detect heteroskedasticity, model specification tests, tests of the stability of the regression parameter estimates, causality tests, and tests for outliers). Please provide evidence in support of your answer.
- D.T.E. 1-3 Please refer to page 77 of the Company's filing. Please provide the software printouts of the four Daily Firm Sendout regression results. Please include in the printouts all the relevant information (e.g., coefficient of determination, t-statistics, D-W statistics, and P-values).
- D.T.E. 1-4 Please refer to Chart III-C-2 of this filing. Explain the meaning of the negative coefficient signs of the weekend regression equations for the Boston, Essex, and Colonial-Lowell Divisions and the positive coefficient signs for the weekend regression equation for the Colonial-Cape Cod Division and whether these signs correspond with the Company's expectations.
- D.T.E. 1-5 Please refer to page 78 of the Company's filing. In the third step of the Company's forecasting methodology, the Company combines the 2000-01 reference-year sendout, derived from the regression analysis, with the annual incremental sendout forecast discussed in Section III-B to yield the forecast of customer requirement under normal weather conditions. Discuss why the Company uses 2000-01 reference-year sendout derived from the regression analysis instead of using the actual sendout for that same period.
- D.T.E. 1-6 Please refer to page 36 of the Company's filing. Please explain why load reductions forecasted to result from the Company's implementation of demand-side management ('DSM') programs are exogenous to the demand forecast generated by the End-Use Model.
- D.T.E. 1-7 Please refer to page 38 of the Company's filing. Please provide a justification for using the End-Use Model to prepare a single demand forecast for the traditional markets served by the former Boston Gas, Colonial Gas and Essex Gas systems given that the socio-economic, demographic and climatic characteristics of the four geographic regions (Boston, Essex, Lowell and Cape Cod) served by the KeySpan system may differ from each other. In your

answer, provide data comparing the values of the key variables that the Company used to forecast demand for the traditional markets for each of the four geographic regions.

- D.T.E. 1-8 Please refer to page 38 of the Company's filing. Please provide evidence to support KeySpan's claim that the End-Use Model is more sophisticated and more detailed than the econometric approach in forecasting demand. In your response:
- (a) outline the qualities of a good forecasting model, and show how the End-Use Model and the econometric approach to demand forecasting satisfy these qualities;
  - (b) discuss the advantages and disadvantages of the End-Use Model vis-à-vis the econometric approach to demand forecasting;
  - (c) compare the performance of the End-Use Model used by Boston Gas in its past forecast and supply plans versus the econometric approach to demand forecasting used by Colonial Gas and Essex Gas in their past forecast and supply plans. Your response should include also a description of the backcasting and other means used by the former Boston Gas, Colonial Gas, and Essex Gas to evaluate the performance of their forecast and supply plans; and
  - (d) discuss how the Company compared and evaluated its forecasts and backcasts of its resource plans and commitments relative to other LDCs in Massachusetts.
- D.T.E. 1-9 Please provide a 2001 Backcasting Table (in the same fashion as Chart III-B-18) for gross load additions in the former Colonial Gas (Lowell and Cape Cod Divisions) and Essex Gas service territories.
- D.T.E. 1-10 Please refer to pages 40 and 41 of the Company's filing. Please justify the Company's decision to estimate incremental and base-year total energy demand for each market segment first using the End-Use Model before calculating the share of that demand that will be captured by natural gas. In your response:
- (a) discuss the advantages and disadvantages of the Company's method for forecasting natural gas demand versus using the End-Use Model to directly forecast base-year and incremental natural gas demand for each market segment;
  - (b) discuss how KeySpan calculated or projected the share of base-year and incremental energy demand that will be captured by natural gas. Please show any formula(s) or equations that the Company used to calculate or project the share of natural gas in (a) the base-year and (b) incremental energy demand over the forecast period, including any assumptions that the Company may have made.

D.T.E. 1-11 Please refer to pages 38 through 55 of the Company's filing. For each traditional market segment (i.e., the residential market segment, the commercial market segment, and the industrial market segment):

- (a) provide a comprehensive economic theory/model of the determinants of (i) base-year energy demand, (ii) incremental energy demand, (iii) base-year demand for natural gas as an energy source, and (iv) incremental demand for natural gas as an energy source within the framework of the End-Use Model;
- (b) In your response to (a) above, please list and define all of the key variables included in the economic theory/model, and discuss the relationships and interrelationships between these variables, including a discussion of the variables which are endogenous and those which are exogenous;
- (c) discuss all implicit and explicit assumptions underlying the economic theory/ model; and
- (d) in each case, please provide a schematic diagram of the economic theory/model.

D.T.E. 1-12 In light of your response to D.T.E. 1-11 above, and with reference to Charts III-B-1, III-B-2, III-B-3, and III-B-4 of the Company's filing, please evaluate the Company's End-Use Model in forecasting (a) base-year and (b) incremental energy and natural gas demand for each traditional market segment in relation to the following factors:

- (a) the comprehensiveness of the Company's End-Use Model regarding the key variables included in the model;
- (b) the definition and operationalization of the key variables included in the Company's End-Use Model; and
- (c) the extent to which all of the assumptions of the Company's End-Use Model are satisfied.

D.T.E. 1-13 Please refer to page 41 of the Company's filing. Aside from the total number of households, please explain how the Company accounted for variables such as household size and composition in estimating residential base-year energy demand.

D.T.E. 1-14 Please refer to page 42 of the Company's filing.

- (a) Please provide a copy of the final report of the Boston Gas Home Energy Use Survey (1998);
- (b) Please provide all relevant documentation relating to the conduct of the Boston Gas Home Energy Use Survey (1998), including documentation on procedures for survey design and sample size selection, documentation on the development of survey instruments used in data collection, documentation on interviewer

- training and supervision, interviewers' manual, coding manual, and documentation on data cleaning and editing procedures;
- (c) Please describe the level of training, technical competence, and industry experience of the principal investigator(s) involved in conducting the Boston Gas Home Energy Use Survey (1998).
- D.T.E. 1-15 Please refer to page 47 of the Company's filing. The Company states that "[t]he model treats increases in the number of households as newly constructed housing units." Please explain whether and how the model's results will change if increases in the number of households are due not only to newly constructed housing units but also to increased occupancy of vacant housing units.
- D.T.E. 1-16 Please refer to page 48 of the Company's filing and also to pages 45 through 54 of the ENERGY Report. On page 48 of the Company's filing, the Company states that "...the model assumes that annual energy demand for existing households is price elastic."
- (a) Please explain if the Company expects any divergence between the price elasticity of demand for (total) energy and the price elasticity of demand for a specific fuel, such as natural gas, in existing households in the short run and in the long run; and
- (b) Please discuss the theoretical, conceptual, and measurement issues regarding the calculation of the price elasticity of household demand for energy, and how the Company addressed these issues in forecasting incremental energy demand for existing and new households.
- D.T.E. 1-17 Please refer to page 48 of the Company's filing.
- (a) Please explain how accurate DRI-WEFA fuel-price projections have been in the past ten (10) years. Please provide evidence to support your answer; and
- (b) Please explain which other sources the Company examined for fuel-price projections and why the Company decided to use the DRI-WEFA projections in preparing its demand forecasts.
- D.T.E. 1-18 Please refer to page 54 of the Company's filing and also to pages 45 through 54 of the ENERGY Report. On page 54 of the Company's filing, the Company states that "...the model assumes that annual energy demand for existing commercial/industrial establishments is price elastic."
- (a) Please explain if the Company expects any divergence between the price elasticity of commercial/industrial demand for (total) energy and the price

- elasticity of commercial/industrial demand for a specific fuel, such as natural gas, in the short run and in the long run;
- (b) Please discuss the theoretical, conceptual, and measurement issues regarding the calculation of the price elasticity of commercial/industrial demand for energy, and how the Company addressed these issues in forecasting incremental commercial/industrial energy demand.
- D.T.E. 1-19 On page 48 of the ENERGY Report, ENERGY recommends no changes in the two estimates of gas short-run demand elasticities. That recommendation is based on literature review (see Table 32 of the Report). Please provide:
- (a) information on when the literature review on gas price elasticity was updated;
- (b) provide a discussion on why the Company believes that the introduction of transportation programs in 1996 for C&I customers and in 2000 for residential customers will not affect gas price elasticity of demand.
- D.T.E. 1-20 Please refer to page 55 of the Company's filing. Please explain the extent to which, if any, the Company considered the following factors as influencing base-year and incremental vehicle demand for natural gas:
- (i) growth in disposable personal and household income
- (ii) growth in commercial and industrial output
- (iii) level and trends in interest rates and the availability of credit
- (iv) current and projected demographics, and changes in demographic composition by age and sex
- (v) consumer tastes and preferences, and
- (vi) existing vehicle survival rates
- D.T.E. 1-21 Please refer to page 61 of the Company's filing. Please provide figures showing energy savings per year attributed to the implementation of DSM programs by the former Boston Gas, Colonial Gas, and Essex Gas during each Company's previous forecast period. How do these figures together compare with estimates of DSM volume reductions of 569 BBTus per year, on average, during KeySpan's forecast period. Please explain.
- D.T.E. 1-22 On page 62 of the Company's filing, KeySpan states that the Boston Gas transportation program for C&I customers was introduced in the Colonial and Essex service territories in May 2000. Please describe the transportation program referred to here, considering that both Colonial and Essex have been offering transportation to C&I customers since 1993.

- D.T.E. 1-23 On page 62 of the Company's filing, KeySpan states that the Boston Gas transportation program for C&I customers was introduced in the Colonial Gas and Essex Gas service territories in May 2000. Please explain how the Company takes into account the potential transportation migration in the former service territories of Colonial Gas and Essex Gas during the forecast period.
- D.T.E. 1-24 Please refer to page 62 of the Company's filing and explain KeySpan's experience to date with migration from sales to transportation and reverse migration from transportation to sales in each geographic region of the Company's service territory (i.e., Boston, Essex, Lowell and Cape Cod Divisions). Please explain how the Company included this experience in forecasting demand during the forecast period. Please provide relevant data to support your answer.
- D.T.E. 1-25 Please refer to page 63 of the Company's filing. Please explain why the Company analyzed migration history that has occurred over the period 1997 through 2001 for Boston Gas, to the exclusion of similar data from Colonial Gas and Essex Gas, in formulating the Company's forecast of transportation migration over the forecast period.
- D.T.E. 1-26 On page 65 of the Company's filing, the Company notes that "...KeySpan has the flexibility to eliminate up to 100 percent of its existing domestic gas-commodity purchase contracts in less than a twelve-month period." Are there any contractual liabilities to the Company if the Company decides to modify/eliminate such existing commodity purchase contracts? Please explain.
- D.T.E. 1-27 On page 70 of the Company's filing, KeySpan states that "The high-demand scenario assumes that household growth and employment rates will be 50 percent greater than those forecasted in the base-case scenario."
- (a) Using historical household and employment data over the past twenty (20) years, please assess the reasonableness of this assumption. Please indicate the source(s) of your data;
  - (b) Please explain when was the last time that KeySpan experienced such growth rates in the Company's various service territories; and
  - (c) Given that the high-demand scenario is not supported by the Company's historical experience, what effect will that have on the Company and its customers in terms of resource planning? Please explain.

D.T.E. 1-28 Please refer to page 74 of the Company's filing. Please provide evidence to support the Company's assertion that "since customer consumption patterns and fuel-choice decisions do not vary significantly across the three systems, the model algorithms that capture these patterns and decisions are accurate across the territories."

D.T.E. 1-29 Please refer to page 79 of the Company's filing.

- (a) Please provide worksheets showing that the EDD values for LIA are normally-distributed, with an average of 6,461.90 EDD and a standard deviation of 340.73 EDD; and
- (b) Please provide worksheets that show the distribution of EDD values in the Company's other service territories (i.e., Lowell, Cape Cod, and Essex Divisions). How do the distributions of the EDD values in these territories compare with that at LIA?

D.T.E. 1-30 Please refer to page 80 of the Company's filing.

- (a) In establishing the Company's design day standard, how does the current probability of occurrence of once in 46.69 years compare with the probability of occurrence used by the former Boston Gas, Colonial Gas and Essex Gas to establish design day standards in their previous forecast and supply plans;
- (b) Please explain how KeySpan's probability of occurrence of once in 46.69 years used in establishing the Company's current design day standard compare with the probability of occurrence used by other LDCs in (i) Massachusetts and (ii) New England in their forecast and supply plans; and
- (c) Please provide documentation showing the Company's on-going review of planning standards to date, and highlight the main findings and conclusions of the review.

D.T.E. 1-31 On pages 81 through 83 of the Company's filing, KeySpan makes reference to "re-light costs," "freeze-up damages," and "economic damages." Please define explicitly the meaning of these terms; show how the Company quantified costs associated with each component of the "re-light costs," "freeze-up damages," and "economic damages." Where the Company used imputed costs:

- (a) please explain the imputation method used;
- (b) explain whether the definition of "costs" as used here is limited to private costs or includes also societal costs; and
- (c) explain whether the Company has looked into purchasing insurance to avoid being liable for such costs.

D.T.E. 1-32 Please refer to pages 85 and 86 of the Company's filing.

- (a) The Company derives the magnitude of the Gross State Product (GSP) per day for its service territory by assuming a one-to-one relationship between employment and output. Please explain the theoretical and/or empirical foundations for this assumption;
- (b) discuss the other indicators, if any, that the Company investigated when determining the GSP/day for Massachusetts;
- (c) please discuss the assumptions that the Company made in determining the GSP/day, and how the Company verified the validity of the assumptions;
- (d) please discuss how the Company verified the validity and the reliability of the data provided by Data Resources, Inc. that were used to calculate the GSP; and
- (e) please provide the rationale for using the GSP/day to determine the cost of curtailment of gas service to the Company's customers.

D.T.E. 1-33 Please explain the reason(s) KeySpan did not establish a cold-snap planning standard and a cold-snap sendout requirement as part of its forecast and supply plan.

D.T.E. 1-34 Please refer to page 87 of the Company's filing. Of the 34 percent of the Company's sendout that comprises C&I customers during the heating season, please indicate what percentage have dual fuel capabilities.

D.T.E. 1-35 In the fifth step of the Company's forecasting methodology (see page 88 of the Company's filing), the Company combines the 2000-01 reference-year sendout, derived from the regression analysis, with the annual incremental sendout forecast discussed in Section III-B to yield the forecast of customer requirement under design-weather conditions.

- (a) Please explain the differences between the third and fifth steps of the Company's forecasting methodology;
- (b) explain how the regression analysis is used in this fifth step; and
- (c) explain how the annual incremental sendout forecast is computed.

D.T.E. 1-36 Please refer to Appendix A of the Company's filing entitled Research for New Boston Gas Energy Demand Model, Final Report, (March 24, 2000) prepared by ENERGY ("ENERGY Report"). On page 2 of the ENERGY Report, the Company notes that "The population unit must represent a homogeneous unit in terms of energy consumption that can be easily defined and forecast over-time."

- (a) Please explain the extent to which KeySpan's commercial customers and industrial consumers can be classified as one homogeneous unit in terms of

- energy consumption. Please provide data on energy consumption separately for commercial customers and industrial customers to support your answer; and
- (b) Please explain the rationale for combining commercial customers with industrial customers in the calculation of energy intensity factors. In your response, please discuss the advantages and disadvantages of calculating energy intensity factors separately for commercial customers and industrial customers versus calculating energy intensity factors for commercial and industrial customers combined.
- D.T.E. 1-37 Please refer to page 2 of the ENERGY Report. The Report notes that the estimation of energy factors combined both Boston Gas data unique to its service territories and national data collected by the Department of Energy. Please explain how representative the Boston Gas data are for the entire KeySpan service territory.
- D.T.E. 1-38 Please refer to pages 8 through 16 of the ENERGY Report. Please explain whether energy consumption used in the energy intensity factors is primary energy or site energy.
- D.T.E. 1-39 Please refer to page 8 of the ENERGY Report. Please explain whether the Company removed weather-induced “energy conservation” from the total residential energy consumption before calculating the energy intensity factor for the residential sector.
- D.T.E. 1-40 Please refer to page 8 of the ENERGY Report. Please explain why the Company calculated the residential energy intensity factor as per household, rather than calculating the residential energy intensity factor as per building, or square foot, or household member. In your response, please discuss the strengths and weaknesses of measuring the residential energy intensity factor as per household, versus as per building, or square foot, or household member. Also, please address how the residential energy intensity factor per household incorporates changing household member compositions, size, and housing type distributions.
- D.T.E. 1-41 Please refer to page 10 of the ENERGY Report. Please explain whether the Company adjusted for weather and vacancy effects on energy consumption in calculating the energy intensity factor for the commercial sector.
- D.T.E. 1-42 Please refer to page 10 of the ENERGY Report. Please explain why the Company calculated the commercial energy intensity factor as per employee, versus calculating the commercial energy intensity factor as per building, or square foot, or square-foot-hour, or dollar of gross domestic product for

services (in constant dollars). In your response, please discuss the strengths and weaknesses of measuring the commercial energy intensity factor as per employee, versus as per building, or square foot, or square-foot-hour, or dollar of gross domestic product for services (in constant dollars).

- D.T.E. 1-43 Please refer to pages 10 through 12 of the ENERGY Report. Please explain why the Company calculated the commercial energy intensity factor as per employee but calculated the market share of a given fuel based on floor space.
- D.T.E. 1-44 Please refer to page 15 of the ENERGY Report. Please explain why the Company calculated the industrial energy intensity factor as per employee. In your response, please discuss the theoretical basis for calculating industrial energy intensity factors as per employee, including a discussion of the relationship, if any, between labor intensity and energy intensity. Also, please provide empirical evidence from any authentic and reliable source which shows that industrial energy intensity factors have been calculated as per employee.
- D.T.E. 1-45 On page 53 of the Company's filing, the Company states that the forecast of new commercial/industrial markets begins with a county-level projection of employment prepared by DRI-WEFA adapted to KeySpans' service territory, and further segmented by SIC code (see also Chart III-B-7). Please explain quantitatively and qualitatively how the county-level projection of employment was adapted to the Company's service territory.
- D.T.E. 1-46 Please discuss the need for and present evidence of the homogeneity and consistency of the different employment sources used by the Company: Dun & Bradstreet iMarket.Data (see p. 13 of the appendices), Massachusetts Division of Employment and Training (see page 43 of the Company's filing), DRI-WEFA (see page 43 of the Company's filing) and Data Resources, Inc. (see page 86 of the Company's filing). Please, provide the rationale for using these different data sources.
- D.T.E. 1-47 Please refer to pages 15 through 19 of the ENERGY Report. Please indicate which energy consumption measures (e.g., site consumption of energy, total inputs of energy, and offsite-produced energy) the Company included in the industrial energy consumption figure used to calculate the industrial energy intensity factor, and why?

- D.T.E. 1-48 Please refer to page 15 of the ENERGY Report. Please discuss the strengths and weaknesses of measuring the industrial energy intensity factor as per employee, versus as per gross output, or industrial production, or value added, or gross product originating, or value of shipments, or value of production, or adjusted-capacity value of production.
- D.T.E. 1-49 Please refer to pages 15 through 17 of the ENERGY Report. Please explain why the Company calculated the industrial energy intensity factor as per employee but calculated the market share of a given fuel based on the number of establishments.
- D.T.E. 1-50 Please refer to page 18, Table 8, of the ENERGY Report. For each end use listed in the Table, discuss the relationship between the number of employees (or labor intensity) and the end use.
- D.T.E. 1-51 Please refer to page 20 of the ENERGY Report.
- (a) Please provide a copy of the Colonial Saturation Survey;
  - (b) Please provide all relevant documentation relating to the conduct of the Colonial Saturation Survey, including documentation on procedures for survey design and sample size selection, documentation on the development of survey instruments used in data collection, documentation on interviewer training and supervision, interviewers' manual, coding manual, and documentation on data cleaning and editing procedures; and
  - (c) Please describe the level of training, technical competence, and industry experience of all persons involved in conducting the Colonial Saturation Survey.
- D.T.E. 1-52 Please refer to page 31 of the ENERGY Report. Regarding the "several phone interviews with Boston Gas account managers" to collect data to estimate fuel choice among new customers:
- (a) provide a copy of the survey instruments used to collect the data;
  - (b) explain how the interviewees were selected, and the number of Boston Gas managers interviewed;
  - (c) discuss the representativeness of the sample of managers interviewed in relation to the entire KeySpan system;
  - (d) present and discuss the statistical model used to estimate the probability that a new customer will choose a particular fuel based on the data collected from the interviews;
  - (e) discuss the advantages and disadvantages of data collected from phone interviews (as in this case) versus data collected via mail survey and personal

- interviews, and explain why the Company decided on the telephone survey method; and
- (f) compare the results of your survey (*i.e.*, the probability estimates of choosing a particular fuel) with results from fuel choice studies from any published or unpublished sources. Please indicate the sources of these studies.
- D.T.E. 1-53 Please refer to page 33 of the ENERGY Report. Please explain in detail how the “loyalty factors” are derived, indicating the main determinants of the “loyalty factors.”
- D.T.E. 1-54 On page 34 of the ENERGY Report it is stated that the fuel switching model accounts for consumer response to price factors and for other non-price variables.
- (a) List the other non-price variables that the model has taken into account;
- (b) Discuss how each of those variables may affect the fuel switching rate; and
- (c) Explain how and where the fuel switching model captures the effect of non-price variables on fuel switching rates.
- D.T.E. 1-55 On page 36 of the ENERGY Report, the Company states that “while the use of a linear model may be a simplification of the relationship between the two sets of data, we believe the choice is justified given the relatively small dataset available for the analysis.” Please explain the reason(s) for the Company’s position that “the use of a linear model may be a simplification of the relationship between the two sets of data.” Also explain the Company’s position that “the choice is justified given the relatively small dataset available for the analysis.”
- D.T.E. 1-56 Please provide measures of forecasting accuracy of the residential fuel switching model as presented in the ENERGY Report.
- D.T.E. 1-57 Please discuss the interpretation of the intercept of the fuel switching equation (see page 37 of the ENERGY Report).
- D.T.E. 1-58 With regard to the Company’s commercial fuel switching methodology discussed on page 38 of the ENERGY Report:
- (a) discuss and present in detail the financial calculations leading to the annual net benefit of switching from oil to gas; and
- (b) provide measures of forecasting accuracy of the commercial fuel switching model.

- D.T.E. 1-59 Please describe the level of training, technical competence, and industry experience of each Company employee directly involved in the formulation of the Company's forecast and supply plan.
- D.T.E. 1-60 Please describe the level of training, technical competence, and industry experience of each ENERGY staff directly involved in the preparation of the ENERGY Report.
- D.T.E. 1-61 Please refer to page 20 of the Company's filing. Please calculate the correlation coefficient between the daily gas flow of the former Boston Gas system and the daily gas flow of the former Colonial Gas system for each year in the past five years.
- D.T.E. 1-62 Please refer to page 23 of the Company's filing. Please provide a year-by-year projection of gas consumption in each of KeySpan's service territories (i.e., Boston, Essex, Lowell and Cape Cod Divisions).
- D.T.E. 1-63 Please refer to page 24 and Chart II-C-2 of the Company's filing. Please discuss how far north (i.e., north of Eastham) KeySpan provides gas service to customers. What is the likelihood that KeySpan would extend its service territory beyond the current boundaries in the next 5, 10, 15 and 20 years?
- D.T.E. 1-64 Please refer to pages 37 and 38 of the Company's filing. The Company states that KeySpan will use the End-Use Model to forecast demand; that Colonial Gas and Essex Gas did not use the End-Use Model in their previous forecast and supply plans; and that KeySpan will examine the accuracy of past forecasts of demand. Please explain for how long Boston Gas has used the End-Use Model in forecasting demand? Do KeySpan's sister companies also use the End-Use Model in other jurisdictions? Please explain.
- D.T.E. 1-65 Please refer to page 66 of the Company's filing. With respect to capacity within the KeySpan system, doesn't the Company need to plan for the distribution needs of both firm sales and firm transportation customers?
- D.T.E. 1-66 Please refer to pages 67 and 68 of the Company's filing. Once new gas demand is projected using the End-Use Model, does it matter with respect to planning for capacity within the KeySpan system if the percentage of new load moving directly to transportation increases? Please explain.

- D.T.E. 1-67 Please refer to page 89 of the Company's filing. Please explain whether the tabulated customer requirements include only firm transportation customers or only firm sales customers.
- D.T.E. 1-68 Please refer to Chart III-A-1 of the Company's filing. Please provide forecasted sendout requirements separately for each geographic region served by the KeySpan system.
- D.T.E. 1-69 Please refer to Appendix A of the Company's filing. Please detail the quality control procedure(s) used by ENERGY for statistical and other analyses of numerical data that are presented in the Appendix.
- D.T.E. 1-70 Please refer to Appendix A of the Company's filing. Please detail the quality control procedure(s) used by ENERGY for statistical and other analyses of numerical data that were used but not presented in Appendix A.
- D.T.E. 1-71 Please refer to Appendix A of the Company's filing. Please detail the quality control procedure(s) used by the Company to review statistical and other analyses of numerical data that are presented in Appendix A.
- D.T.E. 1-72 Please refer to Appendix A of the Company's filing. Please detail the quality control procedure(s) used by the Company to review statistical and other analyses of numerical data that were used but not presented in Appendix A.
- D.T.E. 1-73 Please refer to Appendix A of the Company's filing. Please provide the qualifications of individuals who were responsible for performing and reviewing statistical and other analyses of numerical data that were used in Appendix A.
- D.T.E. 1-74 Please refer to pages 33 and 34 of Appendix A to the Company's filing. Please state the number of years for which one would need conversions data in order to accurately evaluate the relationship between fuel prices and the rate of residential conversions. Please give reasons for your response.
- D.T.E. 1-75 Please refer to page 34 of Appendix A to the Company's filing. Please state the number of years for which the Company has data for residential conversions.
- D.T.E. 1-76 Please refer to page 34 of Appendix A to the Company's filing. ENERGY has stated that six years' data establishes "the realistic bounds for any projections of residential fuel switching." Please explain how ENERGY reached this conclusion.

- D.T.E. 1-77 Please refer to Appendix A, page 34, of the Company's filing. If 3,780 annual conversions represent an average number for residential fuel switching, 3,146 annual conversions represent a lower bound on switching, 4,239 annual conversions represent an upper bound, what other information is needed on residential fuel switching in order to predict base case, low-demand case, and high-demand case annual load additions for 2002-2006?
- D.T.E. 1-78 Please refer to Appendix A, page 34, of the Company's filing. Please present backup calculations for the fuel prices (\$/MMBtu) presented by year. Do these values account for inherent inefficiencies in heating technology?
- D.T.E. 1-79 Please refer to Appendix A, page 35, of the Company's filing. Please explain why ENERGY selected the oil/gas price ratio as the statistic to account for the two price variables, rather than (1) the gas/oil price ratio, (2) the oil-gas price difference, or (3) the oil price minus half the gas price.
- D.T.E. 1-80 Please refer to pages 34 and 36 of the ENERGY report. Please provide the correlation coefficient  $r$  and statistical significance  $p$  of the "recognizable linear pattern" of each of Figures 1 and 2. Please indicate whether a statistical analysis supports the conclusion that there's a relationship between oil/gas price ratio and number of conversions. Please indicate whether a statistical analysis supports a conclusion that any such relationship is linear. Please indicate whether it is reasonable to assume that the conversion rate is affected by the oil/gas price ratio, with or without regard to the statistical findings.
- D.T.E. 1-81 Please refer to Appendix A, pages 35 and 36, of the Company's filing. Please select a statistically useful number of data points from which to predict future conversion rates. Using data from that number of years, please present (a) scatter plots showing conversion rates, and (b) correlation coefficients with their statistical significance, for conversion rate as a linear function for: (1) the oil/gas price ratio, (2) the gas/oil price ratio, (3) the oil-gas price difference, and (4) the oil price less minus half the gas price, for current year prices and previous year prices. Please indicate which scatter plot best illustrates the influence on fuel prices on conversion rates and explain.
- D.T.E. 1-82 Please refer to Appendix A, page 37, of the Company's filing. With regard to the statistical analysis, please provide numerical examples from published or unpublished sources where the spread in one variable is divided by the spread in another variable and the ratio is identified as the slope "M" of a linear relationship from a scatter plot.

- D.T.E. 1-83 Please refer to Appendix A, page 38, of the Company's filing. Please state the number of years for which one would need data or conversions in order to accurately evaluate relationships of prices to commercial conversions. Please explain your answer in detail.
- D.T.E. 1-84 Please refer to page 38 of Appendix A of the Company's filing. Please specify the number of years the Company maintains data or conversions.
- D.T.E. 1-85 Please refer to Appendix A, page 41 and 42, of the Company's filing. Please provide a copy of the "financial spreadsheet," incorporating the actual values used to determine annual net benefits as a function of the oil/gas price ratio. Are conversion costs reflected in the spreadsheet?
- D.T.E. 1-86 Please refer to page 42 of Appendix A of the Company's filing. Please provide the equation of the line shown in Figure 5 (e.g.,  $ANB = \$12,000 \times [(oil\ price/gas\ price) - 1]$ ). Are conversion costs reflected in the equation?
- D.T.E. 1-87 Please refer to Appendix A, pages 41 through 44, of the Company's filing. Please explain the point in showing the intermediate step of extrapolating ANB if annual switching is a linear function of "ANB" and "ANB" is a linear function of a fuel price factor. Please explain why ENERGY did not extrapolate annual switching directly as a function of the fuel price factor. What is the most useful factor on which to base a prediction of conversion volume?
- D.T.E. 1-88 Please refer to Appendix A, pages 39 through 41, of the Company's filing. Please explain why ENERGY selected the oil/gas price ratio as the statistic to account for the two price variables rather than (1) the gas/oil price ratio, (2) the oil-gas price difference, or (3) the oil price minus half the gas price. When a longer series of past years' data is used, which of these best predicts the conversion rate?